

CLAIMS

That which is claimed is:

1. A method for forming a resilient, fluid-filled bladder structure, the method comprising steps of:

placing at least one core between a first sheet and a second sheet of thermoplastic material, said at least one core having a first outer layer and a second outer layer, said outer layers being spaced apart and connected together by a plurality of connecting members;

heating said first sheet, said second sheet, and said at least one core; and

bonding said first sheet to said first outer layer, bonding said second sheet to said second outer layer, and bonding said first sheet and said second sheet together around a periphery of said at least one core by compressing said first sheet, said second sheet, and said at least one core in a mold such that:

- a) a first portion of said mold contacts said first sheet adjacent to said first outer layer to bond said first sheet to said first outer layer and form a sidewall around the periphery of said at least one core,
- b) a second portion of said mold contacts said second sheet adjacent to said second outer layer, thereby bonding said second sheet to said second outer layer, and
- c) said first sheet and said second sheet are compressed together around the periphery of said at least one core to form a peripheral bond between said second sheet and said sidewall of said first sheet.

2. The method of claim 1, wherein the step of bonding includes forming a portion of said first sheet into a substantially planar first surface of said bladder and forming said second sheet into a substantially planar second surface of said bladder, said first surface being substantially parallel with said second surface.

3. The method of claim 2, wherein the step of bonding includes forming said peripheral bond at a location substantially coinciding with said second surface.

4. The method of claim 2, further including the step of structuring said mold to have an indentation for forming said sidewall.

5. The method of claim 4, wherein said step of structuring said mold includes configuring said indentation to form said sidewall with a height that positions said peripheral bond at a location substantially coinciding with said second surface.

6. The method of claim 1, wherein a step of inserting a pressurized fluid into a space bounded by said peripheral bond, said first sheet, and said second sheet is performed following the step of bonding to inflate said bladder and place said connecting members in an tensile configuration.

7. The method of claim 1, wherein the step of placing said at least one core between said first sheet and said second sheet includes placing an inflation needle between said first sheet and said second sheet.

8. The method of claim 7, wherein the step of bonding includes forming an inflation conduit between said first sheet and said second sheet, said inflation conduit placing said inflation needle in fluid communication with a space bounded by said peripheral bond, said first sheet, and said second sheet.

9. The method of claim 8, wherein the step of bonding includes ejecting a fluid from said inflation needle, passing said fluid through said inflation conduit and into said space, and pressurizing said space to press said first sheet against said first portion of said mold and press said second sheet against said second portion of said mold.

10. The method of claim 9, wherein the step of bonding includes forming a partial vacuum adjacent to exterior surfaces of said first sheet and said second sheet, said partial vacuum drawing said first sheet against said first portion of said mold and drawing said second sheet against said second portion of said mold.

11. The method of claim 1, wherein the step of bonding includes forming a partial vacuum adjacent to exterior surfaces of said first sheet and said second sheet, said partial vacuum drawing said first sheet against said first portion of said mold and drawing said second sheet against said second portion of said mold.

12. The method of claim 1, wherein the step of placing said at least one core between said first sheet and said second sheet includes positioning said at least one core on said first sheet

such that said first portion of said mold and said second portion of said mold contact areas of said first sheet and said second sheet adjacent to said outer layers during the step of bonding.

13. The method of claim 12, wherein the step of placing said at least one core between said first sheet and said second sheet includes attaching said at least one core to said first sheet and then placing said second sheet over said at least one core.

14. The method of claim 1, wherein the step of placing said at least one core between said first sheet and said second sheet includes securing said first sheet and said second sheet to a transport mechanism that moves said first sheet and said second sheet between the steps of heating and bonding.

15. The method of claim 1, wherein prior to the step of placing said at least one core between said first sheet and said second sheet, a first coupling layer is bonded to said first outer layer and a second coupling layer is bonded to said second outer layer, said first and second coupling layers being formed of a thermoplastic material that facilitates bonding of said outer layers with said first and second sheets during the step of bonding.

16. The method of claim 1, wherein a step of incorporating said bladder structure into a sole structure of an article of footwear is performed following the step of bonding.

17. A method for forming a resilient, fluid-filled bladder structure, the method comprising steps of:

forming at least one core that includes a first outer layer and a second outer layer spaced apart and connected together by a plurality of connecting members, said first outer layer including a first coupling layer and said second outer layer including a second coupling layer, said coupling layers being formed of a thermoplastic material;

placing said at least one core between a first sheet and a second sheet that are formed of said thermoplastic material such that said first outer layer is positioned adjacent to said first sheet and said second outer layer is positioned adjacent to said second sheet;

heating said first sheet, said second sheet, and said at least one core;

bonding said first sheet to said first outer layer, bonding said second sheet to said second outer layer, and bonding said first sheet and said second sheet together around a periphery of said at least one core by compressing said first sheet, said second sheet, and said at least one core between a first portion and a second portion of a mold such that:

- a) said first portion of said mold contacts said first sheet adjacent to said first outer layer, thereby bonding said first sheet to said first outer layer,
- b) said first portion of said mold forms a first part of said first sheet into a substantially planar first surface of said bladder and forms a second part of said first sheet into a sidewall of said bladder,
- c) said second portion of said mold contacts said second sheet adjacent to said second outer layer, thereby bonding said second sheet to said second outer layer,

- d) said second portion of said mold forms said second sheet into a substantially planar second surface of said bladder that is substantially parallel to said first surface, and
- e) said first sheet and said second sheet are compressed together around the periphery of said at least one core to form a peripheral bond between said second sheet and said second part of said first sheet, said peripheral bond being positioned at a location substantially coinciding with said second surface.

18. The method of claim 17, wherein a step of inserting a pressurized fluid into a space bounded by said peripheral bond, said first sheet, and said second sheet is performed following the step of bonding to inflate said bladder and place said connecting members in an tensile configuration.

19. The method of claim 17, wherein the step of placing said at least one core between said first sheet and said second sheet includes placing an inflation needle between said first sheet and said second sheet.

20. The method of claim 19, wherein the step of bonding includes forming an inflation conduit between said first sheet and said second sheet, said inflation conduit placing said inflation needle in fluid communication with a space bounded by said peripheral bond, said first sheet, and said second sheet.

21. The method of claim 20, wherein the step of bonding includes ejecting a fluid from said inflation needle, passing said fluid through said inflation conduit and into said space, and pressurizing said space to press said first sheet against said first portion of said mold and press said second sheet against said second portion of said mold.

22. The method of claim 21, wherein the step of bonding includes forming a partial vacuum adjacent to exterior surfaces of said first sheet and said second sheet, said partial vacuum drawing said first sheet against said first portion of said mold and drawing said second sheet against said second portion of said mold.

23. The method of claim 17, wherein the step of bonding includes forming a partial vacuum adjacent to exterior surfaces of said first sheet and said second sheet, said partial vacuum drawing said first sheet against said first portion of said mold and drawing said second sheet against said second portion of said mold.

24. The method of claim 17, further including the step of structuring said mold to have an indentation for forming said sidewall.

25. The method of claim 24, wherein said step of structuring said mold includes configuring said indentation to form said sidewall with a height that positions said peripheral bond at a location substantially coinciding with said second surface.

26. The method of claim 17, wherein the step of placing said at least one core between said first sheet and said second sheet includes positioning said at least one core on said first sheet such that said first portion of said mold and said second portion of said mold contact areas of said first sheet and said second sheet adjacent to said outer layers during the step of bonding.

27. The method of claim 26, wherein the step of placing said at least one core between said first sheet and said second sheet includes attaching said at least one core to said first sheet and then placing said second sheet over said at least one core.

28. The method of claim 17, wherein the step of placing said at least one core between said first sheet and said second sheet includes securing said first sheet and said second sheet to a transport mechanism that moves said first sheet and said second sheet between the steps of heating and bonding.

29. The method of claim 17, wherein the step of bonding includes placing a pressurized fluid in a space bounded by said peripheral bond, said first sheet, and said second sheet to press said first sheet against said first portion of said mold and press said second sheet against said second portion of said mold.

30. The method of claim 17, wherein a step of incorporating said bladder structure into a sole structure of an article of footwear is performed following the step of bonding.

31. A method for forming a resilient, fluid-filled bladder structure, the method comprising steps of:

placing at least one core between a first sheet and a second sheet of thermoplastic material, said at least one core having a first outer layer and a second outer layer, said outer layers being spaced apart and connected together by a plurality of connecting members;

heating said first sheet, said second sheet, and said at least one core; and

bonding said first sheet to said first outer layer, bonding said second sheet to said second outer layer, and bonding said first sheet and said second sheet together around a periphery of said at least one core by compressing said first sheet, said second sheet, and said at least one core in a mold and inserting a pressurized fluid into a space between said first and second sheets such that:

- a) a first portion of said mold contacts said first sheet adjacent to said first outer layer and said pressurized fluid presses said first sheet against said first portion of said mold to bond said first sheet to said first outer layer and form a sidewall around the periphery of said at least one core,
- b) a second portion of said mold contacts said second sheet adjacent to said second outer layer and said pressurized fluid presses said second sheet against said second portion of said mold to bond said second sheet to said second outer layer, and
- c) said first sheet and said second sheet are compressed together around the periphery of said at least one core to form a peripheral bond between said second sheet and said sidewall of said first sheet.

32. The method of claim 31, wherein the step of bonding includes forming a partial vacuum adjacent to exterior surfaces of said first sheet and said second sheet, said partial vacuum drawing said first sheet against said first portion of said mold and drawing said second sheet against said second portion of said mold.

33. The method of claim 31, further including the step of structuring said mold to have an indentation for forming said sidewall.

34. The method of claim 33, wherein said step of structuring said mold includes configuring said indentation to form said sidewall with a height that positions said peripheral bond at a location substantially coinciding with said second surface.

35. The method of claim 31, wherein a step of incorporating said bladder structure into a sole structure of an article of footwear is performed following the step of bonding.